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METHOD OF PRESENTING AUXILIARY DATA FOR AN INTERACTIVE RECORDING MEDIUM

BACKGROUND OF THE INVENTION

Field of the Invention

5 The present invention relates to a method of presenting A/V data and contents data recorded on an interactive recording medium and contents data provided by a contents providing server connected through the Internet.

Description of the Related Art

10 High-density recording media such as optical disks capable of recording large amounts of data are being widely used. The DVD (digital versatile disc), which is an optical recording medium capable of recording large amounts of high-quality digital video and audio data, is one example of these high-
15 density recording media.

The DVD includes a data stream recording area in which digital A/V data streams are recorded and a navigation data

recording area in which navigation data required for playback control of the A/V data is recorded.

When a DVD is loaded into a DVD reproducing apparatus, the DVD reproducing apparatus first reads the navigation data recorded in the navigation data recording area and stores the navigation data in an internal memory. The DVD reproducing apparatus then begins reproduction of the A/V data recorded in the data stream recording area using the stored navigation data, thereby providing various functions of the DVD to a viewer.

10 The development of new interactive DVDs is being progressing rapidly. Unlike the DVD, the interactive DVD (I-DVD) contains additional contents data, which is detailed information about A/V data recorded thereon, and provides the contents data through a user interface. The contents data may be recorded on 15 the I-DVD as data files such as html files.

In addition, a method for obtaining additional contents data from a contents providing server connected through the Internet and presenting the contents data while A/V data and contents data recorded on the I-DVD are reproduced is under 20 development. However, an effective method for presenting the contents data appropriately according to the attributes is not yet available.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a 25 method of presenting auxiliary contents data recorded on an interactive recording medium or contents data provided by an

external contents providing server appropriately according to the attributes using attribute information recorded on the interactive recording medium or provided by the contents providing server.

5 The method of reproducing an interactive recording medium in a reproducing apparatus in accordance with the present invention comprises the steps of (a) checking attribute information for auxiliary contents data of A/V data recorded on the interactive recording medium and (b) determining a
10 presentation method for the auxiliary contents data based on the attribute information and presenting the auxiliary contents data accordingly.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are included to provide a
15 further understanding of the invention, illustrate the preferred embodiments of the invention, and together with the description, serve to explain the principles of the present invention.

In the drawings:

FIG. 1 illustrates an interactive optical disk reproducing
20 apparatus in which the present invention may be advantageously embodied;

FIG. 2 illustrates the relationship among an A/V data stream, contents navigation information, and contents data files in accordance with the present invention;

25 FIG. 3 illustrates a first embodiment of a method for recording attribute information for contents data files in

accordance with the invention;

FIG. 4 illustrates a second embodiment of a method for recording attribute information for contents data files in accordance with the invention;

5 FIG. 5 illustrates a third embodiment of a method for recording attribute information for contents data files in accordance with the invention; and

FIG. 6 illustrates a fourth embodiment of a method for recording attribute information for contents data files in
10 accordance with the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In order that the invention may be fully understood, preferred embodiments thereof will now be described with reference to the accompanying drawings.

15 FIG. 1 illustrates an interactive optical disk reproducing apparatus in which the present invention may be advantageously embodied. The reproducing apparatus 100 comprises an optical pickup 11, an IDVD system 12, a microprocessor 13, a buffer memory 14, and an Internet interface 15 through which the
20 apparatus 100 is connected to a contents providing server 300.

The IDVD system 12 includes a DVD engine for reproducing A/V data recorded on an I-DVD 10 and an enhanced navigation (ENAV) engine for reproducing contents data provided by the contents providing server 300 or contents data recorded on the
25 I-DVD 10.

The IDVD system 12 outputs the contents data in

synchronization with the A/V data reproduced from the IDVD 10. As shown in FIG. 1, the reproducing apparatus 100 is connected to the contents providing server 300 through the Internet interface 15 by the mutual operations of the microprocessor 13 5 and the ENAV engine included in the IDVD system 12.

ENAV contents data, which is additional contents data associated with the A/V data reproduced from the I-DVD 10, is downloaded from the contents providing server 300 and then temporarily stored in the buffer memory 14. The buffer memory 14 10 can be logically divided into a first buffer (buffer 1) and a second buffer (buffer 2).

The ENAV engine in the IDVD system 12 outputs the A/V data from the I-DVD 10 in synchronization with the ENAV contents data from the I-DVD 10 or outputs the A/V data from the I-DVD 10 in 15 synchronization with the ENAV contents downloaded from the contents providing server 300.

The ENAV contents data recorded on the I-DVD 10 is organized into a plurality of data files and ENAV navigation information for reproducing the data files in synchronization 20 with A/V data may also be recorded thereon. The contents providing server 300 provides various ENAV contents data associated with the A/V data recorded on the I-DVD 10 as a plurality of data files and provides ENAV navigation information for reproducing the data files in synchronization with A/V data. 25 The navigation information may be provided all at once or may be divided into a plurality of pieces and provided one by one when needed.

As shown in FIG. 2, for example, a title of the I-DVD 10 is

organized into a plurality of individual chapters (Chapter#1, Chapter#2, ...) and one or more data files (File#1, File#2, ...) corresponding to each of the chapters are organized as an ENAV unit. Navigation information for managing the data files 5 included in the ENAV unit is provided as ENAV unit information (ENAV_Unit_Info).

The multiple pieces of ENAV unit information (ENAV_Unit#1_Info, ENAV_Unit#2_Info, ...) are defined as a linked list and transmitted along with the ENAV contents data 10 files or transmitted before the ENAV contents data files are sent.

As shown in FIG. 3, the ENAV unit information includes file names of data files included in the associated ENAV unit (File(s) Name), addresses of the data files in the contents 15 providing server 300 (File(s) Address), and attribute information for the data files (File(s) Attribute).

For example, the 'File(s) Attribute' field for File#2 includes the information that 'Type=Non_Square' indicating the image type and 'Ratio=16:9' indicating the aspect ratio and the 20 'File(s) Attribute' field for File#3 includes the information that 'Type=Square' and 'Ratio=4:3'.

The microprocessor 13 controls presentation of the data files using the fields of 'File(s) Name' and 'File(s) Address' included in the ENAV unit information so that the data files 25 reproduced by the ENAV engine may be presented in synchronization with the chapters of the AV data stream reproduced by the DVD engine.

Also, the microprocessor 13 controls the image of the

contents data reproduced by the ENAV engine to be presented with an appropriate image type and aspect ratio using the image type and aspect ratio information of the 'File(s) Attribute' field included in the ENAV unit information.

5 Instead of recording the attribute information explicitly, the attribute information may be implicitly recorded such that it can be identified indirectly from the names of the data files. As shown in FIG. 4, for example, naming File#1 'File#1_S_R_4' makes it possible to identify the information 10 that 'Type=Square' and 'Ratio=4:3' for File#1.

Likewise, the image type and aspect ratio of File#2 may be identified by naming File#2 'File#2_NS_R16', which indicates that 'Type=Non_Square' and 'Ratio=16:9'. The microprocessor 13 determines the image type and aspect ratio of a data file from 15 its name and controls the image of the contents data reproduced by the ENAV engine to be presented with the appropriate attributes in conjunction with the A/V data reproduced from the I-DVD 10.

The attribute information may be included in meta tag 20 information as shown in FIG. 5. For example, if the contents data files are html files, the image type and aspect ratio for an html data file may be recorded in the meta tag information included in the header area thereof.

The attribute information of 'image=Square_4:3' is added to 25 the meta tag information included in the header area of File#1 to indicate that 'Type=Square' and 'Ratio=4:3'. The attribute information of 'image=Non_Square_16:9' is added to the meta tag information included in the header area of File#2 to indicate

that 'Type=Non_Square' and 'Ratio=16:9'.

The microprocessor 13 determines the image type and aspect ratio of a data file from the meta tag information and controls the image of the contents data reproduced by the ENAV engine to 5 be presented with the appropriate attributes in conjunction with the A/V data reproduced from the I-DVD 10.

The attribute information may be included in tag information of a general data file as shown in FIG. 6. For example, the attribute information may be added to tag 10 information, which is positioned at the head or tail of the data file, as image tag information.

Attribute information for File#1 indicating that 'Type=Square' and 'Ratio=4:3' is added to the tag information positioned at the head of File#1. Attribute information for 15 File#2 indicating that 'Type=Non_Square' and 'Ratio=16:9' is added to the tag information positioned at the tail of File#2.

The microprocessor 13 determines the image type and aspect ratio of a data file from the tag information and controls the image of the contents data reproduced by the ENAV engine to be 20 presented with the appropriate attributes in conjunction with the A/V data reproduced from the I-DVD 10.

By the aforementioned procedure, the interactive optical disk reproducing apparatus 100 can present ENAV contents data in synchronization with A/V data reproduced from the I-DVD 10 with 25 an image type and aspect ratio appropriate for the contents data.

The attribute information may include other attributes as well as the image type and aspect ratio of contents data.

The method of presenting auxiliary data for an interactive recording medium in accordance with the present invention allows auxiliary contents data for A/V data recorded on the interactive recording medium to be presented appropriately according to the 5 attributes of the contents data.

While the invention has been disclosed with respect to a limited number of embodiments, those skilled in the art, having the benefit of this disclosure, will appreciate numerous modifications and variations therefrom. It is intended that all 10 such modifications and variations fall within the spirit and scope of the invention.